Amplitude

'862 Claim 13: "Amplitude"

13. A method of processing multiple wavelengths of light, the method comprising:

. . . reflecting the first portion of optical signal wavelengths from the moveable mirror to form at least one MEMS output signal having an amplitude, the amplitude of the MEMS output signal capable of being changed by moving the moveable mirror. . .

’862 Claim 13: “to form at least one MEMS output signal having an amplitude”

Cheetah’s Construction	Defendants’ Construction
An output signal is light reflected off of the MEMS device received at the output interface	To form an output signal using a MEMS device that causes interference between light beams

’862 Claim 13: “the amplitude of the MEMS output signal capable of being changed by moving the moveable mirror”

Cheetah’s Construction	Defendants’ Construction
As the position of the movable mirror changes, the amplitude of the output signal changes	Movement of the mirror capable of causing phase shift to change the amplitude of the MEMS output signal

Cheetah's Construction Is No Construction

Claim Term	Cheetah's Construction
"The amplitude of the MEMS output signal capable of being changed by moving the moveable mirror"	As the position of the movable mirror changes, the amplitude of the output signal changes

Figure 1a is a Building Block in the '862 patent

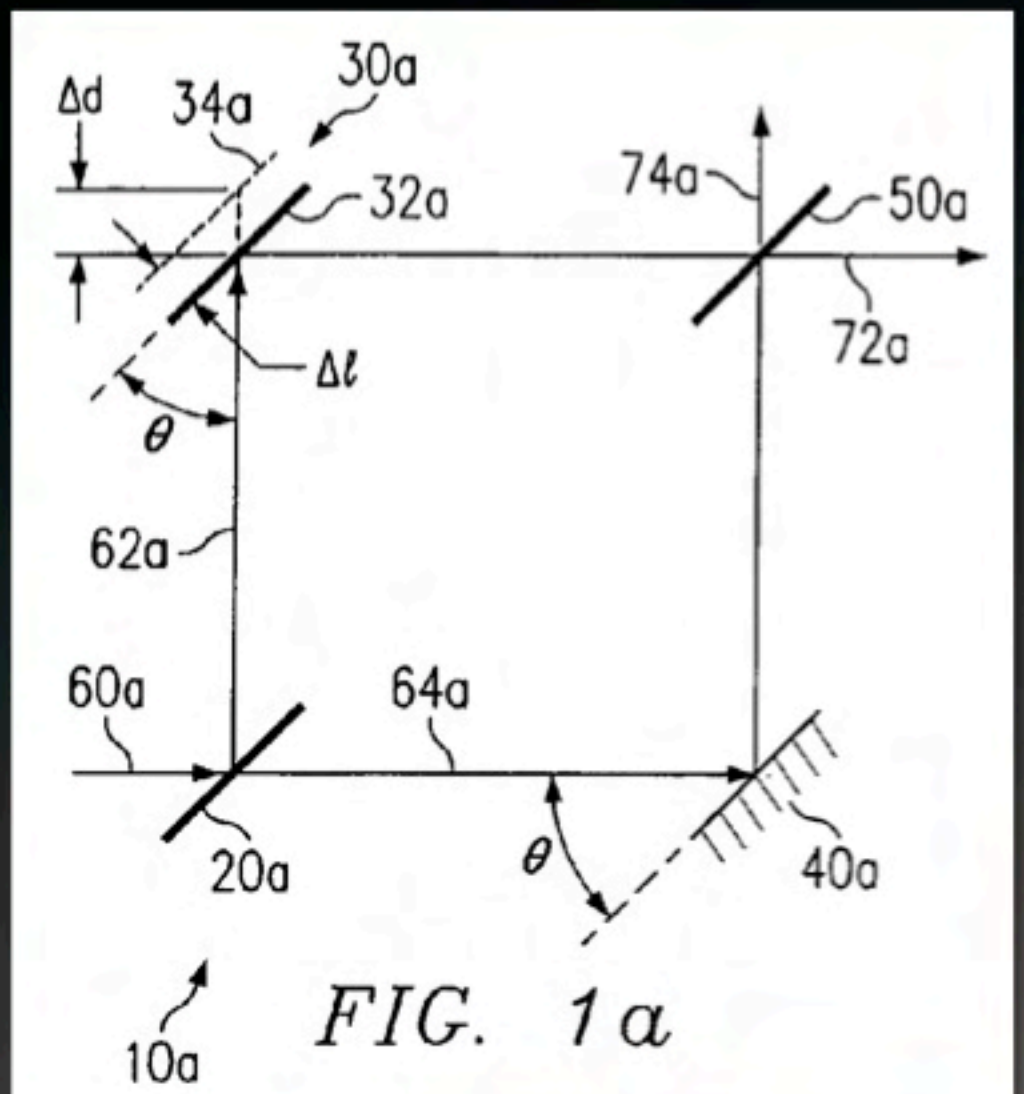


FIG. 1a

DETAILED DESCRIPTION OF THE INVENTION

I. Building Blocks for High Speed Optical Signal Processing

'862 Patent, col. 4 ll. 45.

The '862 Patent Changes Amplitude Only by Using Phase Shift and Interference

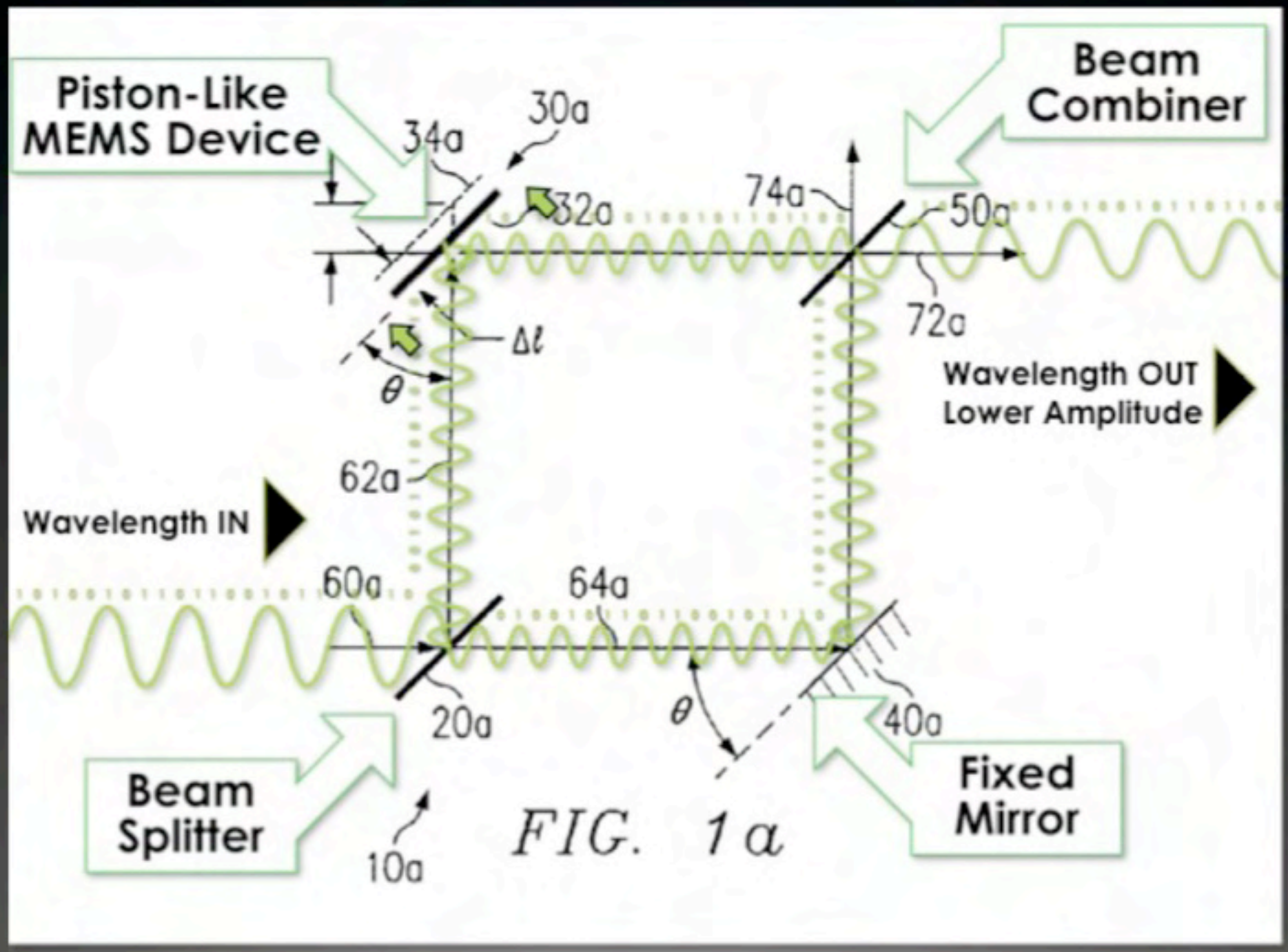


FIG. 1a

Every Embodiment of the '862 Patent Uses Phase Shift and Interference to Change Amplitude

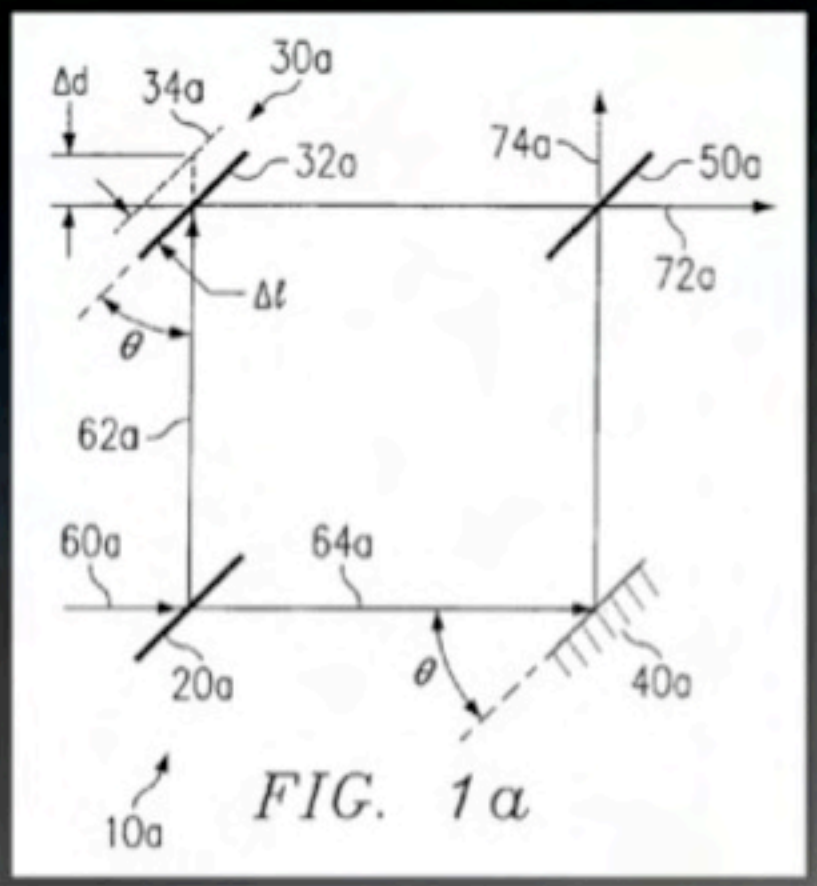


FIG. 1a

5c: Optical Switch

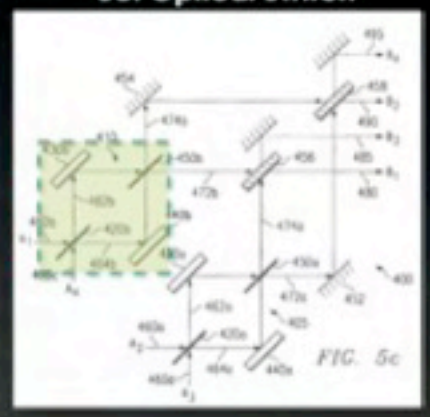


FIG. 5c

8h: Polarization Mode Compensator

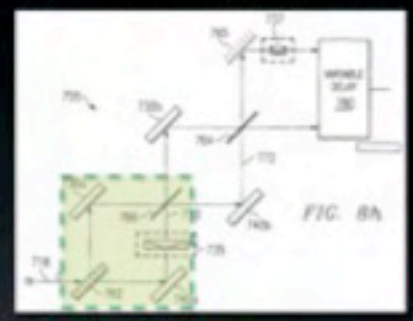


FIG. 8A

7b: Polarization Controller

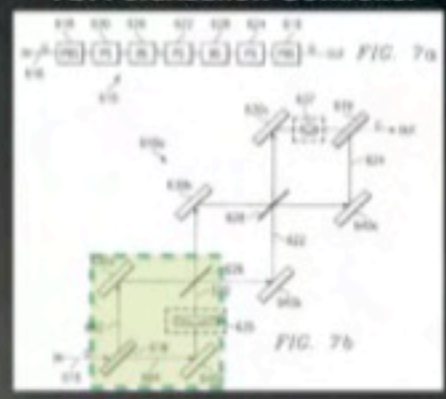


FIG. 7a
FIG. 7b

14c: Optical Equalizer

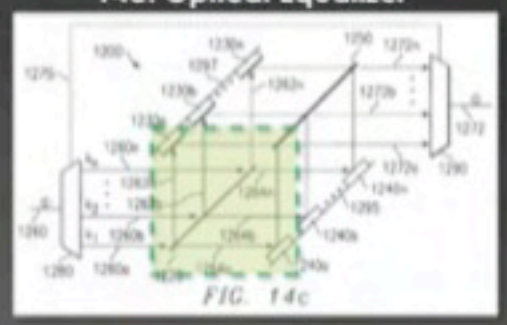


FIG. 14c

16d: Add/drop Multiplexer

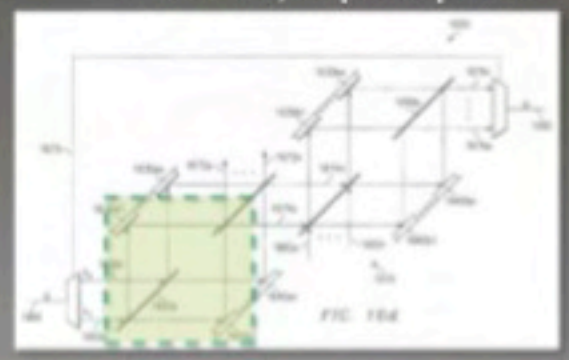


FIG. 16d

10b: Polarization Controller Array

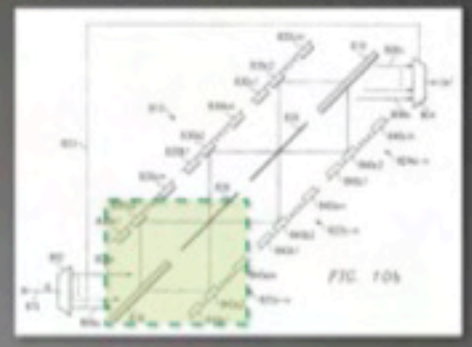


FIG. 10b

Every Embodiment of the '862 Patent Uses Phase Shift and Interference to Change Amplitude

- Cheetah's reply brief does not deny that every embodiment in the '862 patent works this way

  See Reply Br. at 7.

- Cheetah nowhere identifies any other method described or enabled by the '862 patent

Federal Circuit: Claims are Limited to What is Taught in the Specification

On Demand Mach. Corp. v. Ingram Indus., Inc., 442 F.3d 1331, 1338 (Fed. Cir. 2006) ("[T]he scope and outer boundary of claims is set by the patentee's description of his invention.").

➡ **Federal Circuit: "Customer" meant "retail customer" when written description discussed only retail customers.**

Federal Circuit: Claims are Limited to What is Taught in the Specification

Nystrom v. TREX Co., 424 F.3d 1136 (Fed. Cir. 2005) (the patentee is "not entitled to a claim construction divorced from the context of the written description and prosecution history").

➡ Federal Circuit: The claim term "board" meant wooden board when every embodiment involved a wooden board.

Plurality of Wavelengths

'862 Claim 13: "Plurality of Wavelengths"

13. A method of processing multiple wavelengths of light, the method comprising:

. . . communicating an optical signal for processing, the optical signal comprising a plurality of wavelengths

'862 Claim 13: "Plurality of Wavelengths"

Cheetah's Construction	Defendants' Construction
Light of more than one wavelength*	Comprising multiple communication channels

*Cheetah construes the entire phrase "an optical signal for processing, the optical signal comprising a plurality of wavelengths" to mean "light of more than one wavelength."

Cheetah's Construction is No Construction

Claim Term	Cheetah's Construction
plurality of wavelengths	more than one wavelength

'862 Claim 13: Separating into "Wavelengths"

13. A method of processing multiple wavelengths of light, the method comprising:

… separating the optical signal communicated for processing into at least a first portion of optical signal wavelengths and a second portion optical [sic] signal wavelengths . . .

'862 Claim 13: Separating into "Wavelengths"

Cheetah's Construction	Defendants' Construction
Separating the optical signal into two or more wavelengths	Separating the "optical signal" into at least two groups of wavelengths, each containing different communication channels

The '862 Patent Uses "Wavelengths" to Mean "Channels"

US 7,116,862 B1

1

APPARATUS AND METHOD FOR PROVIDING GAIN EQUALIZATION

2

BACKGROUND OF THE INVENTION

multiple wavelength systems. This problem becomes increasingly acute as optical systems strive to implement more and more wavelength channels.

'862 Patent, col. 1 ll. 41-43.

The '862 Patent Uses "Wavelengths" to Mean "Channels"

US 7,116,862 B1

1

APPARATUS AND METHOD FOR PROVIDING GAIN EQUALIZATION

RELATED APPLICATIONS

This application is a continuation of application Ser. No. 10/733,007, entitled "Apparatus and Method for Providing

2

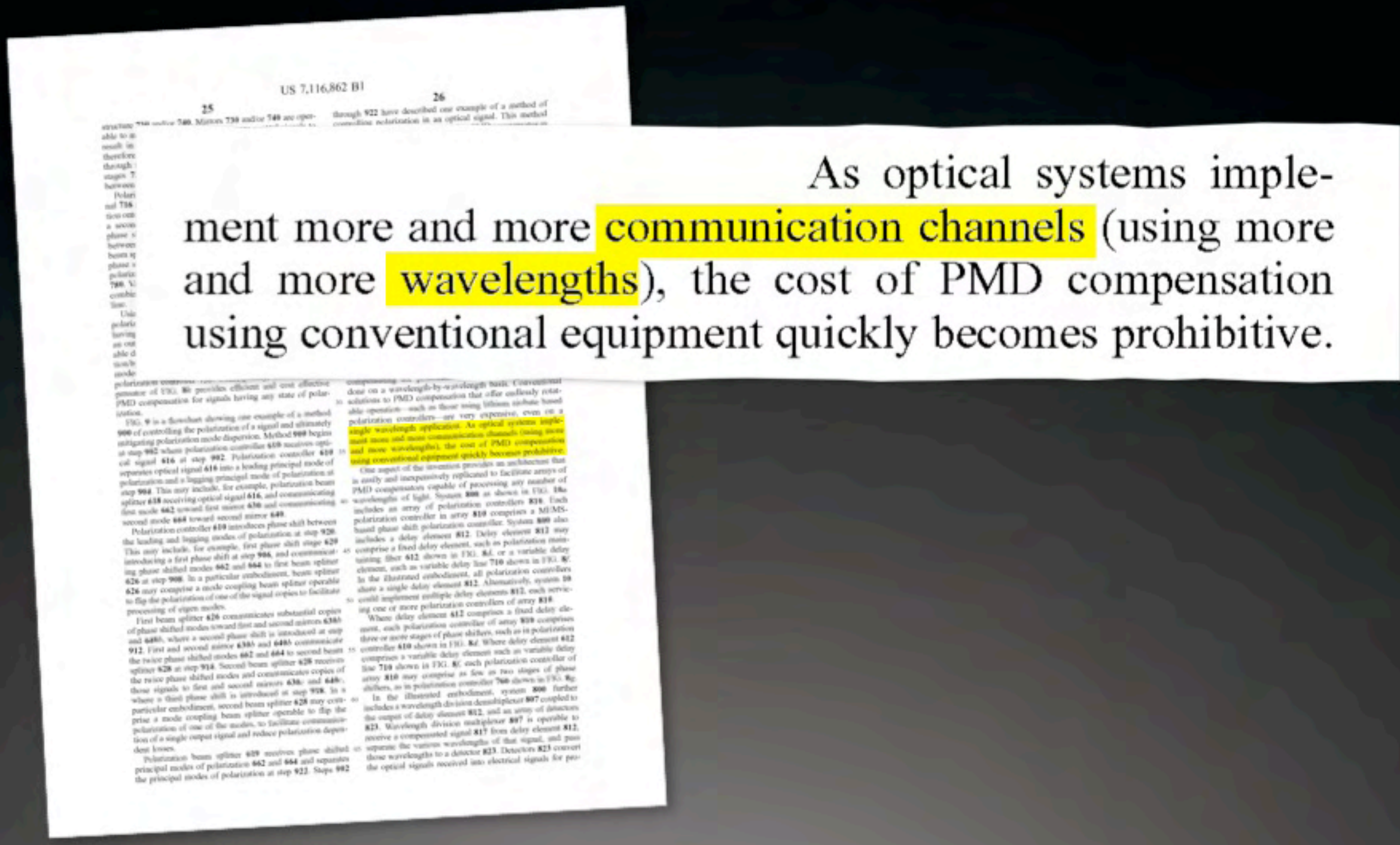
In one aspect of the invention, a gain equalizer comprises a wavelength division demultiplexer operable to separate one or more communication bands into a plurality of wavelengths and an array of phase shifter stages. Each phase shifter stage comprises a micro-electro-optic system (MEMS) device comprising a movable mirror layer operable to receive a first copy of an input signal from a beam splitter and to reflect the first copy of the input signal for

BACKGROUND OF THE INVENTION

power in the fiber is increased, a problem can arise from an inter-channel Raman effect. In particular, longer wavelength channels can rob power from the shorter wavelength channels, creating a gain tilt after propagation through the fiber.

'862 Patent, col. 1 ll. 56-59.

The '862 Patent Uses "Wavelengths" to Mean "Channels"



As optical systems implement more and more communication channels (using more and more wavelengths), the cost of PMD compensation using conventional equipment quickly becomes prohibitive.

'862 Patent, col. 26 ll. 33-36.

The '862 Patent Separates Wavelength Channels for Processing

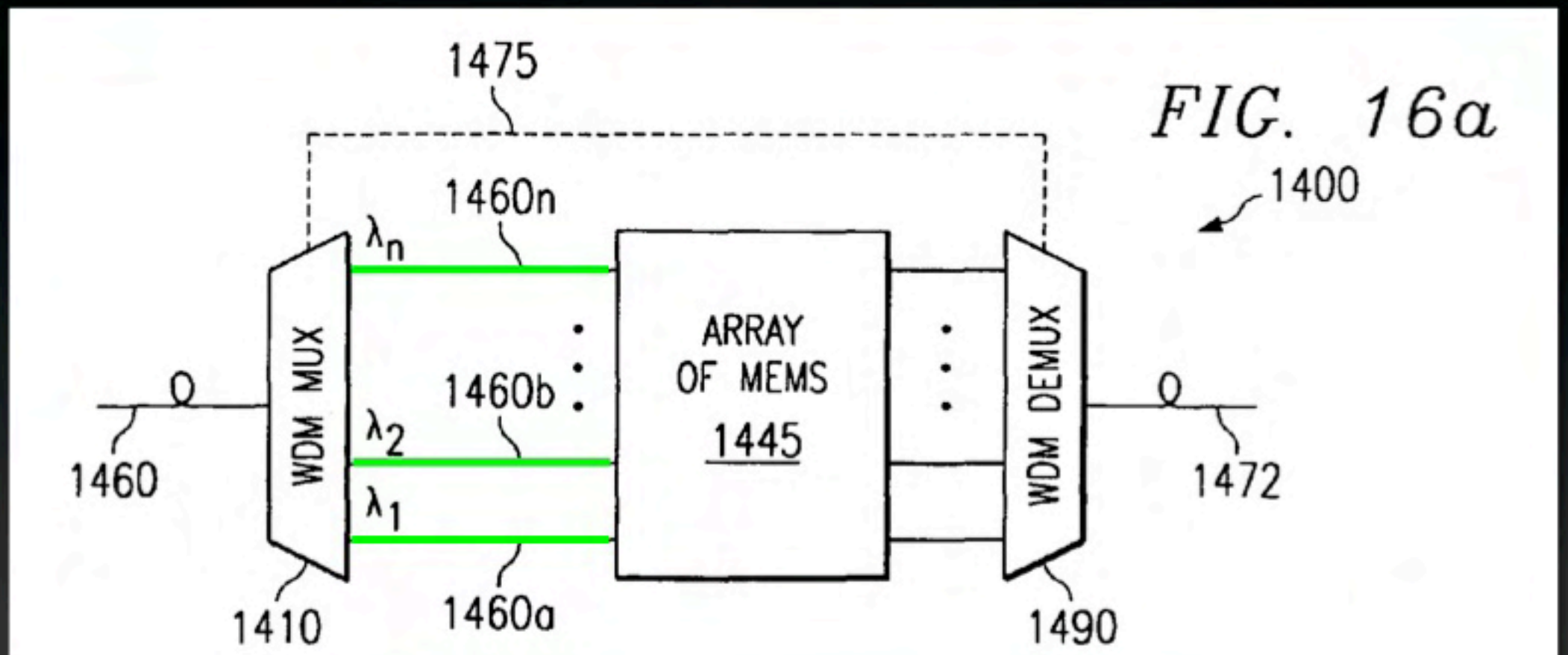


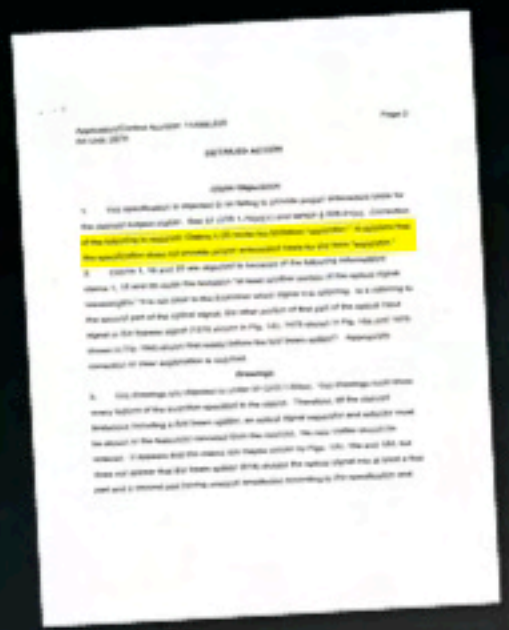
FIG. 16a

1400

an exemplary system **1400** operable to perform wave division add/drop multiplexing. System **1400** includes a wave division demultiplexer **1410** operable to receive an optical signal **1460** and to separate optical signal **1460** into a plurality of wavelengths **1460***a*–**1460***n*. System **1400** further

'862 Patent, col. 36 ll. 28-32.

The Prosecution History Confirms that the "Separating" Step Operates on Wavelength Channels

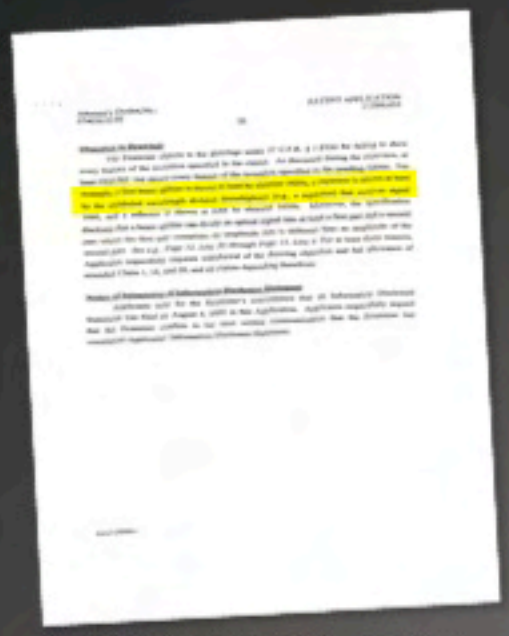


Office Action (mailed Aug. 5, 2005)

Examiner Statement:

It appears that

the specification does not provide proper antecedent basis for the term "separator."



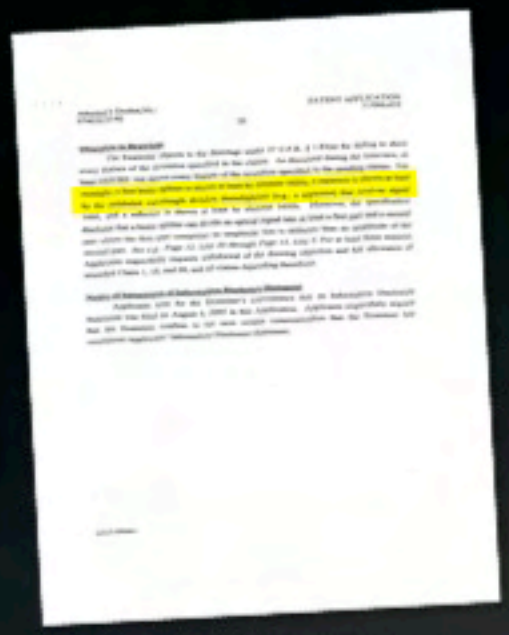
Response (Nov. 1, 2005)

Islam and Kuditcher Statement:

a separator is shown at least

by the unlabeled wavelength division demultiplexer

The Prosecution History Confirms that the "Separating" Step Operates on Wavelength Channels



Response (Nov. 1, 2005)

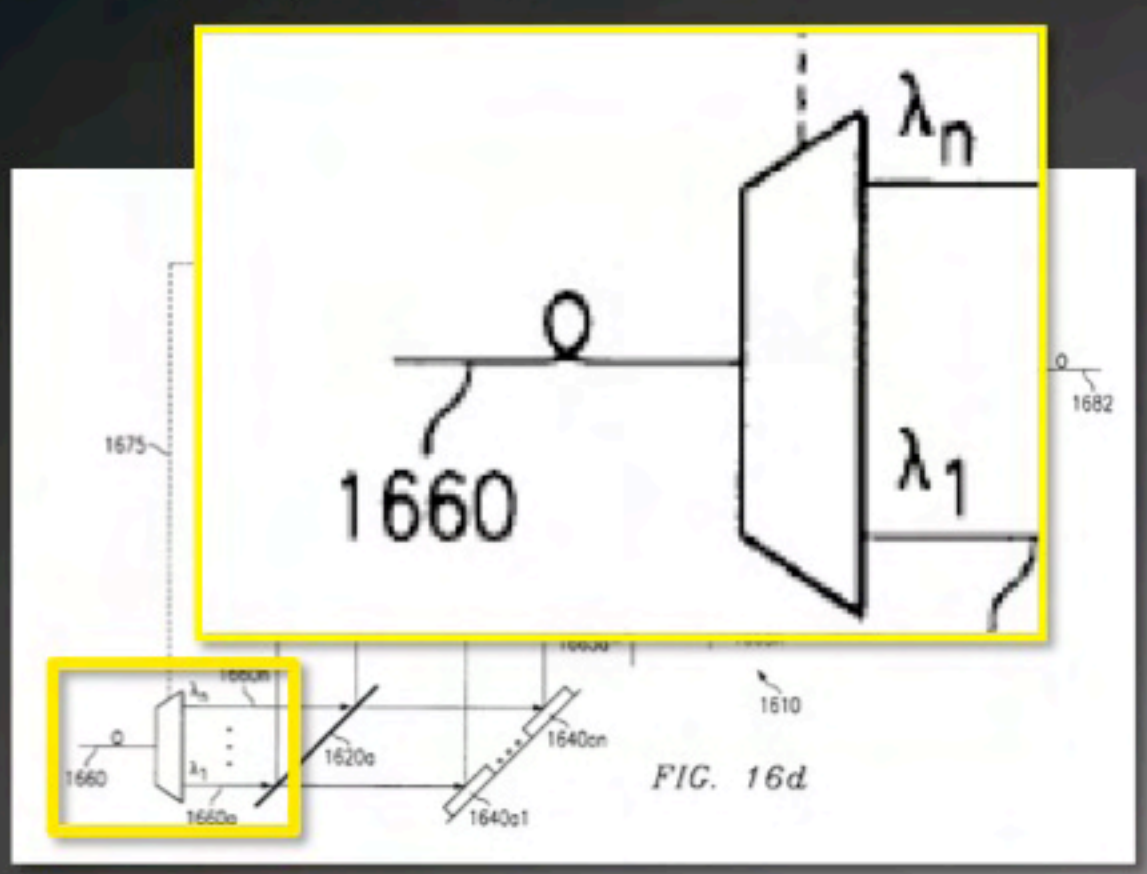
Islam and Kuditcher Statement:

a separator is shown at least

by the unlabeled wavelength division demultiplexer

demultiplexing: The separation of two or more channels previously multiplexed, i.e., the reverse of multiplexing. *Common abbreviation:* **deMUXING.** *Syn-*

Weik, Fiber Optics Standard Dictionary 209 (3d ed. 1997)



Light Pipe

'714 Claim 18: "Light Pipe"

18. A light processing system, comprising:

. . . a light pipe operable to communicate at least the first signal part for processing

'714 Claim 18: "Light Pipe"

Cheetah's Construction	Defendants' Construction
An optical fiber or waveguide	Fiber-optic line

Cheetah's Construction Does Not Help the Jury

Cheetah's Construction: "an optical fiber or waveguide"

What is a "waveguide"?

Cheetah's Construction is Inconsistent with the '714 Patent

The '714 Patent only uses the term "light pipe" once outside of the claims

This usage is simply a reiteration of the claim language:

into a first signal part and a second signal part. The system also comprises a light pipe that is operable to communicate at least the first signal part for processing. The system further

'714 Patent, Col. 1, ll. 52-54

"Light Pipe" Means "Optical Fiber"

also NECA, Separations and Settlements, and Universal Service.

LIFO Last In First Out. A method of organizing queues. See Last In First Out.

Liftoff A term referring to the moment a spacecraft first rises from the ground after its launch. "Five, four, three, two, one, liftoff," the now famous rocketry countdown, was invented by the German director Fritz Lang as a suspense builder for his 1928 science-fiction movie, "Die Frau im Mond," or "The Woman in the Moon," (a.k.a. "By Rocket to the Moon.") A young engineering student, Wernher von Braun, was impressed by the movie, and when he began work on the V-1 and later the V-2 rocket, used it. Later, after the second World War ended and he and some of his colleagues were brought to the U.S. to continue their [illegible] down became a familiar part of the sp[illegible]

Light Technically, light is electroma[illegible] to the human eye. The term is also ap[illegible] ic radiation with properties similar t[illegible] the invisible near-infrared "light" (or r[illegible] radiation) that carries signals in most [illegible] tion systems. Light consists of elect[illegible] narily applied to those having a wave[illegible] cm. (the red ray) to .000038 cm. (the[illegible]

Light Amplification of Stim[illegible] Radiation LASER. A device which transmits a narrow beam of electromagnetic energy in the visible light spectrum. The light waves are in phase with one another, or coherent, rather than jumbled as in normal light. See Laser.

Light Emitting Diode See LED.

Light Pen A video terminal input device which is a light sensitive stylus connected by a cable to the video terminal. The user brings it to the desired point on the screen surface and presses a button. A light pen is used to select options from a menu on the screen or to draw images by dragging the cursor around the screen on a graphics terminal.

Light Piping Use of optical fibers to illuminate.

Light Year The distance that light travels in a pure vacuum (e.g., outer space) during a year. It's a big number. Do the math: 186,000 miles per second x 60 seconds per minute x 60 minutes per hour x 24 hours per day x 365 days per year = 5,865,696,000,000 miles (that's almost six trillion miles). All wave forms in the electromagnetic spectrum propagate at roughly this speed, assuming they are unimpaired by physical matter such as copper wires, earth's atmosphere or glass fibers. Such physical matter not only slows the rate of travel as a result of resistance, but also creates distortion in the signal. See Fiber Optics and Loss.

Lightwave Communications Fiber Optic communications using light to carry information.

Lightwave Transmission This term now means laser communications systems shot through the air (as opposed to glass fiber). Also called "free space lightwave communications." Typically, a signal is radiated directly from a light transmitter to a receiver less than a mile away. Advantages to lightwave transmission: easy to install, no digging of cables, wide bandwidth, reliable, cheap, no FCC frequency clearance approvals required and the receiving and transmitting equipment occupy little space. Disadvantages: only works for a mile or so and is subject to attenuation (fading) from fog and dust. It's perfect for between downtown buildings, where installing cables is too expensive, too cumbersome, too slow, etc. See Laser.

LIJP An ATM term. Leaf Initiated Joint Parameter. Root screening options and Information Element (IE) instructions carried in SETUP message.

Like New A term used in the secondary telecom equipment business. It means in excellent condition. Under normal conditions, the like new equipment could pass as new (i.e., not used, but not necessarily in the O.E.M. packaging). See Like New Repair Update.

Like New Repair And Update LNRU. A term in the industry which repairs telecom equipment. It means all equipment is repaired and updated to the current manufacturer's specifications. New plastic is used to refurbish to a "like new" status. Also added are a new coil cord, line cord and address tray. Included is a full diagnostic test with a burn-in (if required) and an operational system test. Definition courtesy Nittsuko America. See also Repair and Quick Clean and [illegible]

of the lily, cowards would be called "lily-livered."

LIM Link Interface Module.

LIM-EMS The abbreviation for Lotus Intel Microsoft-Expanded Memory Specification. A software technique that allows MS-DOS to access memory beyond one megabyte by mapping the memory into a window in an area that MS-DOS can access. LIM-EMS is one of the greatest techniques for speeding up getting in and out of programs. For example, when my calendar program called Maxi-Calendar is not running, it occupies only 7K of normal RAM and 350K of expanded RAM. When I need it, it swaps itself quickly out of expanded RAM into normal RAM, taking less than half a second. If I didn't have expanded memory, it would take as long as 15 seconds to swap the program onto and off my hard disk, which is the other alternative. LIM stands for Lotus/Intel/Microsoft, the founding organizations that developed the Expanded Memory Specification. AST Research was also part of the driving force behind EMS, though its name doesn't appear in the acronym.

Limited Distance Modem LDM. A special purpose conversion device designed to connect two DTEs (data communications devices) over a relatively short distance, typically up to several miles. An LDM is not really a modem since it does not perform a digital-to-analog conversion, but transmits a special type of digital signal to the other LDM on the circuit. Also called a line driver, local dataset or short haul modem.

Limiter A circuit which shapes a signal sent through it to conform to certain preset tolerances, used in both audio and video to regulate signal flow and prevent overloading, which would lead to distortion and the introduction of spurious noise.

Limiting Amplifier Relating to analog signals and their processing. Also refers to the operating range of an amplifier where little or no distortion occurs.

LINCS Leased Interfacility National Airspace Communications System.

Line The word line is confusing. In traditional telecom, a line is an electrical path (two wires) between a phone company central office and a subscriber, usually with an individual

SAMSUNG-MIT-002-0000202

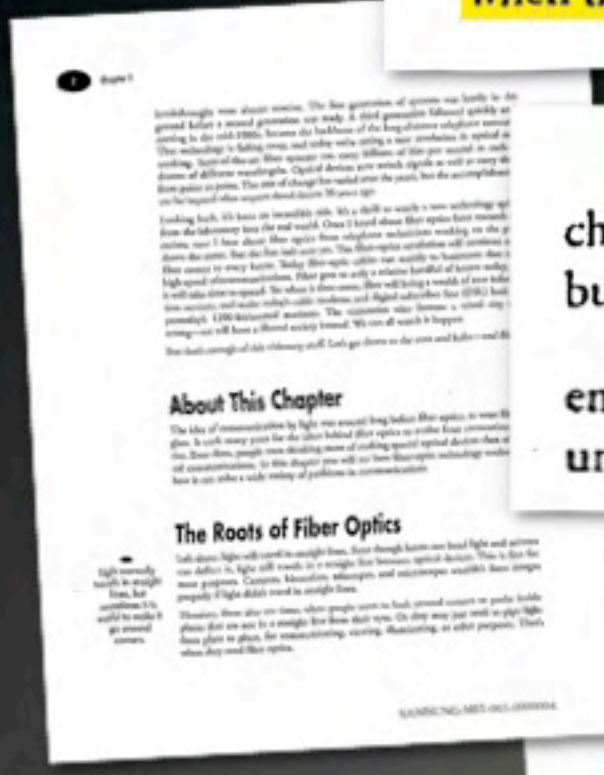
Light Piping Use of optical fibers to illuminate.

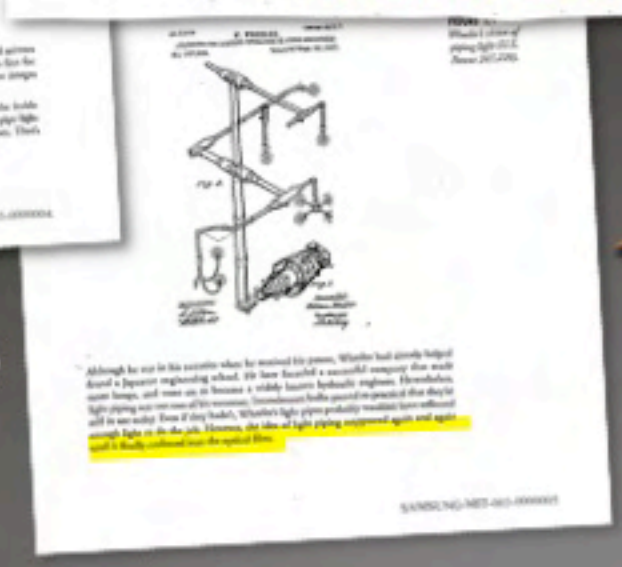
Newton's Telecom Dictionary (16½ ed. 2000).

"Light Pipe" Means "Optical Fiber"

The fiber-optics textbook cited by Cheetah for 'light pipe' actually supports Defendants' construction:

However, there also are times when people want to look around corners or probe inside places that are not in a straight line from their eyes. Or they may just need to pipe light from place to place, for communicating, viewing, illuminating, or other purposes. That's when they need fiber optics.





Jeff Hecht, Understanding Fiber Optics 2-3 (4th ed. 2002)

In 1881, a Concord, Massachusetts, engineer named William Wheeler patented a scheme for piping light through buildings.

. . .

enough light to do the job. However, the idea of light piping reappeared again and again until it finally coalesced into the optical fiber.

Kopykake Enters., Inc. v. Lucks Co., 264 F.3d 1377, 1383 (Fed. Cir. 2001)

("we consider the meaning of the claim as of the date the invention was constructively reduced to practice -- the date the patent application was filed.")

'714 Patent Uses an Optical Fiber to Communicate an Optical Signal for Processing

Cheetah does not dispute these are the only "light pipes" arguably present in the '714 patent

a light pipe operable to communicate at least the first signal part for processing;

'714 Patent, col. 25 ll. 43-44.

example, OC-48 and OC-192 or higher. In the illustrated embodiment, communication link **1020** comprises a single mode fiber

Electro-optic switch includes a fiber optic tap operable to communicate a first portion of optical signal **1012** to a delay line **1022** and a second portion of optical signal **1012** to a demultiplexer **1024**.

'714 Patent, col. 20 ll. 31-32, 36-39.